

Appl. No. 10/667,666
Amendment dated: February 16, 2005
Reply to OA of: November 16, 2004

REMARKS

Applicants have amended the specification to correct some minor typographical errors and to submit a new Abstract which is found at the end of this paper. These amendments are for purposes of clarification and no new matter has been introduced into the disclosure as would be appreciated by one of ordinary skill in the art to which the invention pertains. Applicants most respectfully submit that the specification and claims are in full compliance with 35 USC 112 and are clearly patentable over the references of record.

In this regard, Applicants note the Examiner's comments on pages 5 and 6 with respect to the prior art. Since this prior art has not been applied against the claims no further comments are believed necessary with respect to these references.

The rejection of claims 1-13 under 35 U.S.C. 103 as unpatentable over Kurosawa et al. has been carefully considered but is most respectfully traversed.

Applicants wish to direct the Examiner's attention to the basic requirements of a prima facie case of obviousness as set forth in the MPEP § 2143. This section states that to establish a prima facie case of obviousness, three basic criteria first must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine the reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations.

The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, not in applicant's disclosure. In re Vaeck, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

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Section 2143.03 states that all claim limitations must be taught or suggested by the prior art. In re Royka, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). "All words in a claim must be considered in judging the patentability of that claim against the prior art." In re Wilson, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970). If an independent claim is nonobvious under 35 U.S.C. 103, then any claim depending therefrom is nonobvious. In re Fine, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988).

Applicants also most respectfully direct the Examiner's attention to MPEP § 2144.08 (page 2100-114) wherein it is stated that Office personnel should consider all rebuttal argument and evidence present by applicant and the citation of In re Soni for error in not considering evidence presented in the specification.

It is noted in the Official Action that the Examiner cites Kurosawa, Brown et al., Carter et al. and JPA 4-189866 but only applies Kurosawa in the rejection which is specifically traversed for the reasons discussed below.

Kurosawa discloses a curable resin composition comprising (A) hydrolyzate or a partial condensate of an organosilane compound, or both; (B) at least one compound selected from the group consisting of polyamic acids having a hydrolysable silyl group or carboxylic acid anhydride, or both, and polyimide having a hydrosable silyl group or carboxylic acid anhydride, or both; and (C) a chelate compound or alkoxide compound with metal selected from the group consisting of zirconium, titanium, and aluminum. Although Kurosawa discloses the starting material as mentioned in the present application, Kurosawa is silent to prepare poly(silsesquioxane) by sol-gel reaction in advance and also silent to use amino silane coupling agent. The necessary motivation to do this is not found in the prior art and the teaching of the reference does not render the claimed invention prima facie obvious.

Also, in the Examples of Kurosawa's patent, the component (C) a chelate compound containing zirconium, titanium or aluminum is necessary. But in the present application, no chelate compound containing zirconium, titanium, or aluminum is used.

Moreover, since the curable resin composition claimed in Kurosawa is intended to be used as an insulating film in semiconductor devices, the refractive index, bi-refractive index, and absorbance in a frequency range used in optical waveguide of the cured film are not required nor discussed.

Brown et al. discloses an integrated circuit device and process for its manufacture. The Brown's patent does not mention about hybrid material prepared from poly(silsesquioxane) nor mention about a process for producing the hybrid material as mentioned in the present application.

Carter et al. also discloses an integrated circuit device and process for its manufacture. The Carter's patent does not mention about hybrid material prepared from poly(silsesquioxane) nor mention about a process for producing the hybrid material as mentioned in the present application.

Finally, JPA 4-189866 discloses polyamic acid solution composition and its preparation. The process for producing polyamic acid solution composition of '866 comprises the steps of blending (A) solution of organosilsesquioxane modified with an amino-based coupling agent and (B) a solution of polyamic acid. In Comparative Example 2 of the JP patent, coupling agent is added into a mixture of organosilsesquioxane and polyamic acid solution (i.e. the organosilsesquioxane is not modified), and in Comparative Example 3, the polyamic acid solution is first reacted with amino coupling agent and then reacted with organosilsesquioxane, which results in aggregation in the solution and thus cannot form into a film. It means that in the JP patent, the organosilsesquioxane should be first reacted and modified with the amino-based coupling agent. Furthermore, the polyimide prepared from the polyamic acid solution is not intended to be used in optical waveguide field, thus the JP patent does not discuss about refractive index, bi-refractive index and absorbance in a frequency range used in optical waveguide, as discussed in the present application.

However, in the present application, the polyamic acid is modified with coupling agent and then reacted with either poly(silsesquioxane) or silicon alkoxides by sol-gel process, that is, the amino-containing silane coupling agent is first reacted with polyamic acid to control the number of hydroxyl group contained in the polyamic and control its molecular weight. The molecular weight of polyamic acid will influence the surface flatness of the hybrid film prepared therefrom.

Moreover, the present process can produce an organic-inorganic hybrid film material in which the organic material and the inorganic material can be hybridized at any ratio without any phase separation, which has been demonstrated in Examples 2-8 and Figure 5. Such a phase separation of organic-inorganic hybrid material has not been resolved in the art before this application.

Also, as shown in Figure 6, the refractive index of the hybrid film prepared by the present process can be controlled by changing the weight ratio of poly(amic acid) to poly(silsesquioxane), and in Figure 9, it shows that the hybrid film prepared by the present process shows no absorbance in a frequency range used in optical waveguide and can be used as optical waveguide material. From Figure 11, it shows that all hybrid films of the present invention have a pyrolysis temperature of more than 545°C. It demonstrates that the hybrid film of the present invention possesses excellent heat-resistance. Also, a DSC analysis for the hybrid film of the present invention show no glass transition temperature. Finally, from Figure 12, it show that addition of inorganic material will increase stability of the hybrid film.

According to the present process, it can produce a hybrid film possessing excellent heat-resistance and optical properties such as refractive and bi-refractive indexes without phase-separation. Thus the hybrid film produced by the process of the present invention is useful as an optical waveguide material.

In conclusion from the above, the present process for preparing an organic-inorganic hybrid film material is different from those disclosed in the cited references

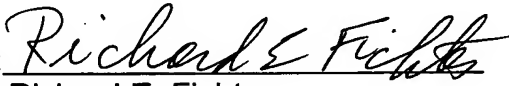
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and is not obvious from the cited references. Therefore claims 1-13 are unobvious and not found or suggested in the cited references and thus should be allowed.

In view of the above comments and further amendments to the specification, favorable reconsideration and allowance of the application are most respectfully requested.

Respectfully submitted,

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